

# AVIATION

*The Oldest American Aeronautical Magazine*

JANUARY 3, 1927

Issued Weekly

PRICE 15 CENTS



A Navy CS plane pictured at the moment of dropping a torpedo

VOLUME  
XXII

## SPECIAL FEATURES

NUMBER  
1

PROGRESS—1926  
ANNUAL REPORT ON NAVAL AVIATION  
DEPARTMENT OF COMMERCE AIR REGULATIONS

GARDNER PUBLISHING CO., INC.  
HIGHLAND, N. Y.

225 FOURTH AVENUE, NEW YORK

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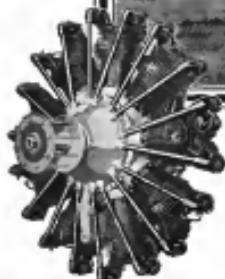
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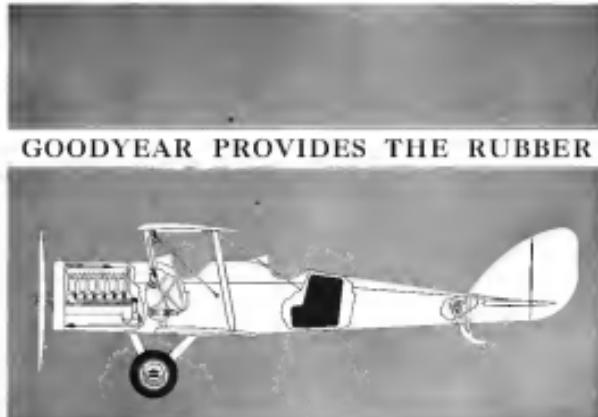


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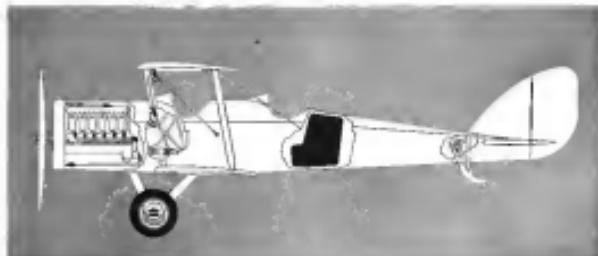
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*Aeronautic Department*

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# AVIATION

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### With the Editor

There is a great sense of satisfaction and pleasure in being able to fill an issue of *AVIATION* with page after page of matter dealing with progress, and that, very much more so when the progress recorded is as great and significant as that during 1926. Recently, the *Aeronautic Chamber of Commerce* presented to the President the most satisfactory report of the present status of all phases of aviation that has ever been made. The past year has seen the air services of the United States established on a sound basis and the *Aircraft Industry*, to which so much of the credit for present progress in aviation is due, is stabilized with an excellent outlook ahead. Commercial aviation, with the aircraft as its backbone, is now on the verge of a brilliant future.

Without doubt, the most important external event has been the issuance by the Department of Commerce of the Air Regulations for civil aviation. The complete document, containing definitions, regulations, and while it is recommended that everyone actively acquainted with aviation obtain a copy of these regulations, because of their extreme significance, they are summarized in this issue to the extent of space below available and the reader is invited to peruse them at his convenience.

And with this excellent record let us wish everyone of the *Aviation* fraternity a happy and prosperous New Year.

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# The CURTISS "HAWK" SERIES



CURTISS P-10 "HAWK" STANDARD ARMY  
TYPE CURTISS D-12 MOTOR



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& MOTOR COMPANY, INC.  
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The Oldest American Aeronautical Magazine

VOL. XXIII

JANUARY 3, 1927

No. 1

## 1926 in Retrospect

LOOKING BACK to 1926, everyone who has played any part in the progress of American Aeronautics must feel that the past has been the best of any that the art and science and industry have known. The Government has stabilized its plans into a program that not only satisfies the public, but pleases the service and the aircraft manufacturers. The Navy has found its aerial arm to have a real purpose and is proceeding to develop it to its maximum efficiency. The Army Air Corps will have funds to round out a supply of well balanced equipment. The aircraft manufacturers and aircraft manufacturers have had the stimulus of general demand and are preparing for a record year in 1927.

Air racing, too, will look back on 1926 as the year of real beginning. Its appeal to all parts of the country has been most amazing and, with the experience gained during this preliminary period, its progress in 1927 should be sound and substantial. The small service operators as well as the commercial aircraft manufacturers have fitted an ever widening market. New uses for aircraft and new commercial types have put America in the lead in that branch of aviation.

The Air Mail has increased its prestige by its regularity and reliability. While 1927 may take the operations out of the hands of the Government, the pioneering work of the men who have so courageously stood by this new development—Proctor, Shantz, Headlam and Goss—will have their names enshrined in the Golden Book of Aeronautical History.

The Department of Commerce has made its best in the commercial field with a very carefully prepared set of regulations and a spirit of cooperation and helpfulness that give great promise. For the new bureau, every good wish is expressed for the coming year and may all the best that we have had of overregulation remain with the new.

In the aeronautic field, the first year's work of the Guggenheim Fund can be viewed with the most complete apprehension and approval. A generous donation, wisely administered and distributed equitably among deserving agencies has given a new incentive to the set aside side of aeronautics. No words of dedication from the whole aeronautic fraternity are adequate to express the wholehearted enthusiasm in which the fatiguing and optimistic donor is held.

And in connection with the scientific progress of the year, the painstaking and fundamental work of the National Advisory Committee for Aeronautics while known to but a limited circle is deserving of the greatest praise and encouragement. At its laboratories at Langley Field, research work is being conducted that would be impossible, except with liberal government support. And it is a fine tribute to the Committee to note that

its expenses have been recognized by adequate appropriations for the coming year.

And now with regard to the future—the prospects for 1927 could hardly be brighter. The past twelve months may already be regarded as a propitious period for astring prosperity, and few will consider this outlook too optimistic.

## Modern Engines in Civil Aviation

IN ALL spheres of progressive progress development is frequently overshadowed by spectacular achievement and, in fact, is sometimes only recognized when a clear insight into statistics is made possible. Such is the aspect from which the figures, published elsewhere in this issue of AVIATION, on the total of 1,000,000 miles flown in civilian aviation in the United States and Canada during the year 1926 measure up to the Wright Whirlwind engines may be viewed.

Earlier this year, AVIATION established the fact that America led the World in the commercial use of airplanes, with a total mileage in civil aviation during 1925 of over 9,000,000 miles. Assuming that the commercial flying average during the year 1926 showed even greater than this ratio of AVIATION, on the total of 1,000,000 miles flown in civilian aviation in the United States and Canada during the year 1926 measure up to the Wright Whirlwind engines.

While these observations reflect the highest credit upon this particular power plant, this is purely incidental, the object at this time being to bring out an important forward step which has been made in the attitude of commercial airplane operators during the past year. For some years after the War, the only power plant suitable for commercial flying was war surplus engines, for the most part, the large power engines used in military training planes. While these engines have proved highly satisfactory for commercial flying, they could, at best, only serve as a stop-gap prior to the production of suitable modern engines.

The Whirlwind has long been recognized as an excellent commercial engine in spite of its having been developed primarily for naval aviation. That commercial operators are already making such extensive use of this power plant, is one of the most satisfactory signs of the growth of commercial aviation into a sound and reliable system built upon modern engineering.

The overall economy in the use of modern equipment is very well indicated by the record of but three forced landings with the modern Whirlwind engine during the entire 1,000,000 miles of commercial flying. The record is an outstanding example of the state of perfection already reached in practical aeronautical engineering.

# Aero. Chamber of Commerce Congratulates President

## Expresses Approval of Messages and Policy of Sound Expansion

THE OFFICERS and directors of the Aeronautical Chamber of Commerce called at the White House on December 22 to present to President Coolidge a message of congratulations for his sound and progressive attitude towards the aeronautical arts and sciences. A letter which presented the unanimous sentiment of the industry was handed to the President. It follows:

### The Letter

"The Aeronautical Chamber of Commerce includes within its membership more than two hundred responsible corporations and individuals interested in various phases of aeronautical aviation. Distributed throughout the entire country it constitutes manufacturers of flying apparatus entering in the service of the Army and Navy, similar manufacturers of commercial aeroplanes, manufacturers of aeronautical accessories for both military and commercial purposes, operators of air lines and aerial service companies, as well as designers, engineers, contractors, etc.

"Because of the nature of the business in which we are engaged and because of the necessarily close relations between our plants, stations and day to day activities and those of various sections of the Government handling aviation, we believe that you might welcome a report from us on the status of aviation in the United States as we see it today. We are convinced that the day is not far distant when the Chamber would be honored by your interest in the interest which you have always evidenced in aviation, especially during the session of Congress recently ended. Accordingly, we have within the last few days concluded a review of the entire industry. Through correspondence and interview, we have been able to determine the general views of the trade which may be summarized as follows:

"A year ago, when Congress convened, the country was faced with the fact that the future course of aviation was to depend on the part that we should play in its early development. We believed that the best way to insure the welfare of the industry was to have the Government serve as a director. Commercial aviation was struggling along without a definite, rooted or legal basis. Service aviation in both the Army and the Navy was without a definite restraining plan. The imperative constantly increasing needs of the Services had to be met as best they could with a meager budget.

### The New Outlook

"The effects of your Administration, culminating in the Act passed in the last Session of Congress, have completely changed the picture. Waraeract has been replaced by military; indefinite hope has been followed by renewed courage and positive assurance.

"The passing of the Air Commerce Act of 1926 has given commercial aviation legal status and vigorous stimulus and growth through proper direction and control. While the Department of Commerce has had but a short time in which to develop an organization for the work, it is doing with the best results anticipated. The work of the Bureau of Standards and the National Research Council in the field of aeronautics is of great assistance in the solution of the problems and its aids are invaluable.

"The Five Year Aviation Programme for the Army and Navy, together with the closer and more definite linking of the Air Corps and the Bureau of Aeronautics with the other branches of the Service has already resulted in establishing a greatly improved understanding both within the Services and with the industry.

"Engineering and manufacturing organizations a year ago

had set to their planes for the future, are now arranging their resources and facilities to meet the requirements now created through the enthusiastic cooperation of the Army, Navy, Post Office and Commerce Departments. In civil aviation a year ago there were a few contract air lines preparing for operation. These have been developed with the cooperation of the Post Office and the Department of Commerce. The number of contracts have been extended, so that it may be said for the first time that commercial aviation in America is at a fact. Although it is not yet too early to make definite predictions as to the financial success or failure of these undertakings, those engaged in the operation of these lines are unanimous by the amount of success today, although some of them are yet able to show profitable operation. Profitable operation is to be expected in the near future as an industry, performance, out of production, out of manufacture and success either for the service of National Defense or for Commercial Air Transportation and to develop air transportation upon a basis of positive public service, giving to our business men and all others an economical, dependable, safe, durable through the establishment of air lines under sound management and efficient operation.

"We sincerely pledge to you our share of this responsibility. We express in your appreciation of your constant interest to continue our international records.

"Aeronautical Chamber of Commerce of America, Inc.  
"Hiram C. Read, President  
Statistical Summary

After reading the letter Col. Paul Henderson gave a statistical summary of the progress of commercial aviation in the United States. It follows:

"Contrary to popular belief the United States enjoys more commercial air transportation than any other country in the world, excepting Great Britain and France.

"Between 3,500 and 5,000 airplanes are now in commercial use in this country, besides the huge fleet of planes used in air mail transportation.

"A total of approximately 600,000 miles are flown by air mail planes annually, the import reveals and existing routes total 20,000 miles. Private operators numbering 299 have carried considerably more than 1,000,000 miles with passengers, and 1,000,000 miles more than 100,000 miles with freight.

"Aircraft sales in the various countries of the Government are looking toward the development of a definite plan for the promotion of the sale of American aeronautical equipment on foreign markets. Such a plan has been effectively followed for a number of years by several of the European countries.

"While the Around the World Flight and the proposed non-stop flight to Paris are the greatest flight American will greatest value to the world, the Aeronautical Chamber of Commerce has taken the place of the Official Aviation Museum set out by European countries, with equipment and with a definite sales purpose to foreign markets.

"Aids from the aeronautical advantages that would accrue to the industry in the carrying out of such a plan, are Government and people would likewise secure greater benefits through lowering of costs that would follow increased production.

"We are pleased to report that the entire industry and, as far as we know, every one else has backed the appointment of each of the three Assistant Secretaries with enthusiastic cooperation and approval. In the selection of P. T. Fisher, Director, Edward P. Warner and William P. MacCracken, Jr., Assistant Secretaries for Aviation in the Department of War, Navy and Commerce, we have assured in our judgment generally that the men selected are capable and qualified to fill the positions and will guarantee a steady and healthy growth.

"The industry feels that through the Five Year Programme for the Services and through the leadership of the Department of Commerce in civil aviation and the cooperation of the Postmaster General in continuing for the Transportation of mail by air that it has now reached a definite restaining period of progressive development.

"We feel confident that these means will result in placing the American Army and the American Navy in newness as an unexampled post of were, provided the spirit of cooperation as manifested by the men who have started out so valiantly to attain the same, continues.

"If the efforts of the Government in their administration of the present laws apply the principle of fostering, strengthening and establishing civil aviation as all of its planes that were so favorably recommended by you and endorsed by Congress as a sound and guiding principle, our progress will just go on and on.

"The main purpose of the present development within our industry is to increase the number of planes in use, in safety, performance, out of production, out of manufacture and success either for the service of National Defense or for Commercial Air Transportation and to develop air transportation upon a basis of positive public service, giving to our business men and all others an economical, dependable, safe, durable through the establishment of air lines under sound management and efficient operation.

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Officers and directors of the Aeronautical Chamber of Commerce who presented to the President a message of congratulations from the industry. They are, left to right, front row: Fred Russell, vice-president, Curtis Aeroplane and Motor Co.; Charles L. Lorraine, president, Wright Aeroplane Corp.; Paul Henderson, general manager, National Air Transport Inc., and president of the Aeronautical Chamber of Commerce; Edward P. Warner, general manager of the Aeronautical Chamber of Commerce; Fred C. Hardesty, president, Pratt & Whitney Aircraft Co.; Dick Jr., Olson Brothers, managing secretary, Aeroplane Chamber of Commerce; Charles H. Lorraine, general manager, Peacock Instrument Co.; J. P. Madsen, general manager, Avco Aircraft Corp.; Edward House, of New York; and Lester D. Lorraine, president, Carder Publishing Co.

# Whirlwind Engines in Commercial Flying

**The Well-Known Radial Air-Cooled Engine Becomes Almost Standard Equipment in its Class for American Commercial Planes.**

**A** COORDINATE in an announcement made by Charles L. Lewman, president of the Wright Aeronautical Corporation of Paterson, N. J., Wright Whirlwind engines in commercial use in the United States and Canada will be sold, Dec. 31, 1926, for \$1,475.00, less 10% for delivery to the North or South of the 40th at the remote. This report is made up from detailed information received at telephones replies to a questionnaire sent to the thirty-three commercial aircraft operators using Wright Whirlwind engines in eighteen different types of commercial planes.

The record shows only three forced landings due to failure of an engine part, none of which was due to the engine or failure to occupants of the plane. The largest out of the remarkable record that Wright engines flew a distance of twenty-five hours around the earth or up to nearly 600,000 miles per flight, however, due directly to engine trouble. One of the forced landings was caused when the Wright 4-4 was about to land after a long flight in a single engine, a single-seat, open cockpit plane, and the engine lost power at high speed low flying over the ground during the work of cut and break tree cutting.

Through a number of Wright Whirlwind engines during 1926 were used by the U. S. Army and Navy Air Services, the Hawaiian Airline, the Pan American Airways, the American Airlines, the Atlantic Coast Line, the Southern, the Duluth, Peoria, Toledo, and Louisville, and were used in the Hendee 20 twin Wright engine plane in Germany, the flying time in those cases has not been made a part of this compilation due to the fact that this is a record of only commercial aircraft using Whirlwind engines in the United States and Canada.

Now, in the interest of the industry and the promotion of the United States air mail, Wright engines in nearly all of these planes, this table shows that thirty-three commercial aircraft operators and 184 Wright Whirlwind engines and the average gasoline consumption was 7.63 miles per gallon. Based from another source, the average gasoline consumption is 12.5 gal. per engine hour, and the oil consumption of these engines is averaging three quarts per hour.

During the year 1926, these eighteen types of commercial aircraft made an average speed of 96 mph.

## In the Reliability Test

In the Second Annual Commercial Airplane Reliability Test of 1926, the Ford Tri-Motor Whirlwind engines were first place in the 1000 hours and third place in a field of twenty-four contestants. The tour covered 2,500 miles, flying over ten States. The first place rating was by the Travel Air plane carrying a cargo of 660 lb. in addition to pilot and fuel at an average speed of 128.4 mph. Second place was won by the Budd Verville 130, carrying a cargo load of over 500 lb. with a speed of 133.6 mph. Third place was won by the Stinson Reliant, carrying a cargo load of 464 lb. at an average speed of 140.7 mph.

At the National Air Races in Philadelphia, the planes powered with Whirlwind were the first of the eighteen planes for which they competed. Elmer Gandy, R. H. Hynd, U. S. A., and three Whirlwind engines in his special 25 ft. flight to the North Pole and return.

According to the report received from the Varney Air Mail Service in June, 1926, they replaced their water-cooled en-

gines with Wright air-cooled engines. Since June they have flown their new engines 159,225 miles with but \$75.00 representing the cost of engine parts and \$25.00 added to the cost of State Hobby Mountain from 80th Lake City, Minn., to the State Hobby Mountain. This cost represents \$1.00 an hour for the cost of engine repair parts for each 25,000 miles flown. Three of these engines gave over 340 hr. in actual flying service in less than five months.

During the Denver Mile High Air Meet, Wright engines won the three first prizes. A Ryan monoplane, with the Doudle Air Transport engine, won the flight from Portland, Oregon, to Los Angeles, Calif., a distance of 1,064 miles in 4 hr., 20 min.

The experience of the Philadelphia Rapid Transit Company with the twelve Whirlwind used by them as their aircraft, used and expense made from Philadelphia to Newark, has been extremely good. This includes the time in service and ground service after 250 hours flying. The cost for repair parts such as rocker arms, valve surfaces, etc., after flying 310,400 miles total only \$75.00, or approximately 30¢ per hour.

According to the statement worked out by the Wright company, the thirty-three commercial aircraft using Whirlwind in 1926, had a total of 18,462.5 hr. in Dec. 1, 1926, with an estimated 1,500 hr. to Dec. 31. The actual average flown by Dec. 1 was 1,626,343.5 added to the estimated total to be flown during the month of December of 1926, brings the total for the year 1926 up to the remarkable figure of 1,874,368.8

Based on the figures of the Association of Broadcasters, Charles L. Lewman, president, Guy Thompson, vice president, and C. G. Peterson, all of the Wright Aeronautical Corporation, say without the aid of a textbook for commercial aviation for 1927. As Mr. Lewman pointed out, these statistics represent the uses of the most used types of commercial aircraft employing the latest and most up to date engine equipment. This fact alone is significant of the growth of commercial aviation during 1926 in the United States.

## Whirlwinds in the P.R.T. Service

The experience of the Philadelphia Rapid Transit Company, Air Service, with the Wright Whirlwind engine and the Ford Tri-Motor Whirlwind engines in the 1000 hours and 1000 miles test was excellent. The company carried three engines and ground service after 250 hr. flying. Two other areas and a few pieces were all the parts replaced, their value being \$50. The average fuel consumption has been 10.5 gal. per hr. and the oil consumption two gal. per hr. This covers an average of the fuel and oil consumption for four months on twelve engines.

Special heat-treated metal is used on the Wright engine, which is the best material. It is a combination of grade, strength, malleability, heat, and wear resistance requiring strength, malleability and long life. It is particularly adapted to heavy-duty aeronautical engine bearings, etc. The aluminum metal contains 24% lead, and possesses the following features: ultimate tensile strength 25,000 lb. per sq. in.; elongation in 2 in. 14%; porosity 1%; tensile hardness 1600 lb. per sq. in.; 40°-100°; shrinking per ft. 1.72 in.; weight .255 lb. per cu. in.; heat conduction deformation 2000 ft. per hr.

# Whirlwind Engines in Commercial Flying



At the top, the Ford Tri-Motor engine in the Trans-Miss, and, in the center, Walter Brookins and Dr. Otto Goldschmidt, winners of the Reliability Test, with the Whirlwind-engined Travel Air. Below them, left, Whirlwind-engined Curtiss Jenny, Captain Jonathan Myllynen, 20th Army Air Service; Detroit. Right, Fokker Universal, Major A. E. Hall, Detroit. Above, Fokker Universal, Captain Fred Moore, in which Commander Alfred S. St. John, St. John's, Ontario, Canada.

# The First Year of the Guggenheim Fund

*Five Education Institutions Endowed for Aeronautics.  
Research and Development Towards Safety Encouraged.*

By HARRY F. GUGGENHEIM

**T**HE DANIEL GUGGENHEIM FUND for the Promotion of Aeronautics was established to help build for the day when the airplane will become a part of our daily lives, to help build the time when America shall take its rightful place in the world, and to help build a better life for America, a heritage from the Wright Brothers.

The trustees of the Fund are men of unusual distinction in aviation, engineering, law and business. And one of the trustees is Orville Wright, the man who made that historic flight at Kitty Hawk just twenty-three years ago, that historic flight that brought man's life a new and wonderful world to conquer—the world of the sky. This world of the sky is the specific purpose of the Fund. We were divided into four divisions, representing successive fields for our activities. They are:

1. Engineering Education for students.
2. Commercial Development.
3. Scientific Research.

4. Educational Information for the public.

The Fund considers a most simple cooperative dissecting organization. The trustees established the four divisions, wherever possible, to carry out its aims. We are directing primary energies to the promotion of ways and means of securing safety in flying.

## Education

In the field of education for students, there are at the present time in this country twenty-three colleges or universities that are giving some attention to aeronautical subjects but the greatest number of them have no practical equipment or staff to develop aeronautics as a separate field of study or education. There are, however, among them, five universities which either have or will shortly possess, laboratories and equipment sufficient for the complete training of aeronautical engineers in both undergraduate and graduate work. Appropriations have been made by the Fund, in some cases to a greater or lesser extent, to a lesser degree to make possible some of these efforts. The two are on the West Coast, one in the Central States, and two in the East. This has been the first step in our program of engineering education for students.

With the exception of these earlier steps, I do not believe that any country in the world will have the facilities or opportunities for the training of aeronautical engineers that the United States has. I believe that we have the most deeply rooted air culture and interests in the promotion of aeronautics which has passed the stage of crude cut-and-try experiment and has reached the state of a highly developed science. I do not mean that there is no place for the researcher in our progress; there is always room for intensive studies but progress is now and we cannot indefinitely wait for research.

In the field of commercial development, the Fund made contributions to six specific commercial developments, attempts to further in every way from a fundamental standpoint, sound commercial development. For example, among our great needs today to make possible commercial flying are airports, the establishment of which is properly a function of the municipalities. In order to encourage the development of airports throughout the country and also to further the use of the air mail, we organized a trust to assist flying men in the development of airports and the promotion of the airways. The plan was made available through the cooperation of the airports and participation of Lieutenant Commander Bryn and I appealed the trust with the co-operation of the Department of Commerce. The plan completed shortly on a schedule made in my office before the trust and with the exception of one day when the plane was snowbound, a tour which included forty-four cities from Washington to San Francisco

and return. No man difficulty was encountered than there would be on a motor trip over good roads today.

There was also an advisor agent on the expedition, Kastner by name, who traveled a few days ahead by train to make arrangements for the acceptance of the party by the local Chamber of Commerce or some other organization. A luncheon or dinner was usually arranged. Kastner told me that there was great jealousy about arranging a party, which would entail the expenditure of two or three hundred dollars on what was considered the splendid planes that the place wouldn't serve on the date set. Kastner, good at evening difficulties, and I'd just make a little personal bet with you on the basis that we'd have right on the dot. I think we did. We were right. The first ten year luncheon in Agoura set Kastner's profits on the forty-three not at forty-four luncheons last year.

The primary reason for the slow commercial development of aviation would seem to be the lack of public confidence in flying. The names of commercial aviation should be secured the day that the public can be impressed not by statistics, but by actual experience that aeronautics are inherently no more dangerous than stampeding animals.

From research can come to practical use from the construction of new and types of aircraft involving a number of radical aerodynamic departures from the conventional airplane. sufficient progress has already been made in the direction of safety to justify faith that a complete solution of this problem is possible and that it is even very near at hand. Indeed, today it is already safe under than it is predicted to be.

Our the part the financial status of the infant aeronautics industry is still the weak link. Manufacturers are financially unable to develop on their own initiative, types that have a definite commercial value. This restricts development for the most part to our types. Governments at the present day, are the principal buyers of airplanes.

## Industrial Safety

Such aeronautical planes as we have are naturally an adaptation for the transportation of military types to meet commercial needs. The aerial transport companies are unable to devote primary attention to designing a safe plane. Their financial position are not strong, their present need, indeed need is a place with a high pay load, measured in terms of commercial transportation. They are unable to develop aircraft primarily to suit a civilian market. This is fundamentally opposed to permanent progress which is to be recommended.

In spite of these circumstances, however, great strides are being made in meeting the problems involved in safe flight. Some extraordinary developments are today taking place. To bring to a focus and to the greatest the greatest possible encouragement to every endeavor to make the airplane safe, and to develop an interest in an open air international air safety competition. The first such international air safety competition will be opened. In the British field of aeronautics, the Royal, consistent with its present policy, is giving special attention to the problems of safe flight and is particularly those problems incident to fog flying.

Information to the public is one of our great responsibilities. We must not only the limitations of the airplane and the participation of Lieutenant Commander Bryn and I appealed the trust with the co-operation of the Department of Commerce. The plan completed shortly on a schedule made in my office before the trust and with the exception of one day when the plane was snowbound, a tour which included forty-four cities from Washington to San Francisco

# Progress—1926

*The Past Twelve Months the Most Significant in the History of Aeronautical Development*

By W. L. LE PAGE

**T**HIS YEAR 1926 undoubtedly will stand out as one of the most significant in the development and establishment of aviation in this country and, since the United States is a leader in engineering development in general, the great aeronautical program made here must have a tremendous world influence. The past few years in particular have seen considerable step-by-step progress, both in airtail accomplishment and in the general conditions under which aviation and the Aircraft Industry have been permitted to grow and each such

year, by President Coolidge, of the three American Secretaries for Aviation in the Department of War, the Navy, and Commerce. On July 2, the Senate confirmed the nominations of Edward P. Warner, then Professor of Aeronautics at Massachusetts Institute of Technology, to Assistant Secretary of the Navy for Aviation and F. Taylor Brown to Assistant Secretary of War for Aviation. Later, on Aug. 16, W. MacCracken, Jr., of Chicago, was appointed by the President Assistant Secretary to the Commerce Department. The appointment of these men, who have long been closely connected with aeronautics to take charge of aviation matters in the Government was accepted by all as most satisfactory and has given a stimulus a definite and积极的 position in the selection of the Government.

## Service Procurement

Congress, during the year has passed the Army and the Navy air acts which will be of great assistance in general the reconstruction of the Marine and Army-Pearson Committees and have set down definite five-year procurement programs for the two services for aircraft for the national defense.

The people at the United States are showing every material signs of having really remedied, and, when in equal and perhaps of more importance, the Congress of the United States is becoming air minded. The result is that the past year has seen the most progressive legislation in this responsible. The former air national air policies and the great aeronautical community of persons who have striven untiringly to put in motion an air fleet and provide the country with what it should have in the way of national defense in the air are well on the way to realization. The President's Budget for the past year, as well as the budget of the Chief Executive, as far as the aircraft procurement had been, the generally of being up to the standard of aircraft procurement had led out of the last winter of Congress.

The contributions of the Army Air Corps, the new name of which is the Air Service, as well as of the Naval Air Service, during the last year, and of the Naval Air Service, have been considerably increased as a result of the contributions by legislation and these services are gradually taking up their rightful places as the fast lines of defense.

While it has seemed appropriate to open this discussion with matters connected for the most part with service aviation, it is well to remember that the Air Corps, as well as the naval air service, has been given the status of a Federal service by the Air Commerce Act of 1926. This act, passed August, 1926, when the State and Local Air Associations of America adopted a resolution to the effect that jurisdiction of civil aeronautics within the powers of the Federal Government, there has been a strong realization of the need of Federal control of civil aviation within certain prescribed limits. It will be recalled that in the first year of its existence, the Air Corps was organized as a bureau within the War Department. In 1923, President Coolidge, among the early enactment of an aerial mail and the successful encouragement of civil flying by the Government. In consequence there was drafted the Weddell Bill to regulate the operation of aircraft in interstate and foreign commerce. This bill passed the Senate but never got much further, although extremely lenient before the House. Conference on the Weddell Bill was adjourned.

Undoubtedly the most important single result of this congressional action during the past year has been the appointment of the control and encouragement of civil aviation.



TALC RYDEN, CHAIRMAN  
President of the Guggenheim Fund and a leader in the industry of publishing aviation

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late in 1925, the Senate passed the Blughan Bill, which was framed as a result of a very careful personal investigation of the real needs of civil aviation carried out earlier by Senator Elmore Blughan of Indiana. It was a slow and arduous battle, however. In March, 1926, the Senate passed the Merrill-Bell Bill which differed only in detail from the Blughan Bill and had the same objects in view. The two bills went into conference, resulting in the Air Commerce Act of 1926 which received the President's signature May 29, 1926. The bill provides that the Department of Commerce shall maintain a civil air navigation, meteorological, and search and rescue service, and to regulate and to promote commerce in the service of rendering the public. It was then Act which created the Assistant Secretary of Commerce for Air, who succeeded the Assistant Secretary of Commerce for MacCready, Jr. Later, through a difference in interpretation, the Senate-Congress appropriated, as an annual allocation, the sum of \$500,000 for the Air Commerce Act to all offices, and the Postmaster General, and the sum of \$100,000 for mail operations. And it is now apparent the intention of an air mail system covering the entire country which will be as far in its entirety, is even now giving indications of its tremendous economic value in the Nation's business.

In February, 1926, President Coolidge signed the Kelly Bill or Air Mail Act, authorizing the Postmaster General to contract for air mail service. Immediately, Pan American Airways, Inc., and the Postmaster General had to begin the possibilities of the air mail service, for by far the most logical route for the most part branching off the main continental mail lines, the operation of which could be let out under contract to private air mail operators. Bills for the respective routes were opened late in 1925 with a view to contract air mail service getting under way by the summer of 1926.

Henry Ford, who had the same time been operating a private air service between Detroit and Cleveland and Detroit and Chicago, was the successful bidder for contract on these two air mail routes and was actually the first contract air mail operator to start carrying mail under his contract. On Feb. 15, 1926, the first Ford mail plane, an all-metal biplane with Liberty engine, left Ford Airport, Dearborn, Mich., for Cleveland with the first load of mail to be carried by air mail. At the same time, the Postmaster General had also recently let, and, during the same time, all other services and several other air mail companies than those mentioned have put air mail routes and are now starting and rendering over their respective routes through all the country. It is the most perfect system of real commercial aviation in the World, and no small share of the credit for the entire organization is due the Hon. W. Irving Harris, Recent Assistant Postmaster General in charge of Air Mail Service in the Post Office Department.

The figures obtained were astonishing. In mere respects they were as great a surprise to those closely connected with aeronautics as they must have been to the laymen in the states and to our friends across the sea. Week by week as the number of airmail statistics were published in these columns,

the mileage mounted higher and higher until the almost phenomenal total figure of 8,263,365 miles flown by airmail lines to the United States during the year 1926 was reached. Encouraging, as it did by almost 1,000 percent, the total amount of airmail carried in the United States during the year 1926, these figures created a renewed interest in commercial flying in this country. The daily papers published the figures, they were frequently band quoted in Washington and the word for organizing the colonial commercial air activity was recognized by everyone. The outlook to the future could hardly be more favorable.

#### The Air Mail

Now has this represented anything like all of the civil aviation activity which has been going on. The World has looked upon the United States as the leader in air mail development. The Trans-Continental Air Mail Service operated by the Post Office Department, for the most part, is the most logical mail system. And it is now apparent the intention of an air mail system covering the entire country which will be as far in its entirety, is even now giving indications of its tremendous economic value in the Nation's business.

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These three Assistant Secretaries for Aviation appointed during the year. Left to right: 1. Major General Elmore M. Blughan (USAAC). 2. Major General William M. McCrady (USAAC). 3. Major General William A. Moffet (USAAC).



PO-5007 PLANE DEVELOPMENT. On the left is Boeing Model 4 (P-12) 400 hp) and (right) is Curtiss P-6C-3 (3-passenger) with a 320 hp engine.

Besides of its wide airmail responsibilities, and the extensive extension program for the transportation of mail, there is no doubt that one of the most important and far-reaching developments during the year was the inauguration of the National Air Transport, or mail route from Chicago, down through the Southwest, to Fort Worth and Dallas, Tex. On May 26, 1926, the first mail plane to operate on this service took off from Maywood Park, Chicago, Ill., towards the Southwest. The mail was so large, exceeding 1000 lbs., that two planes, Curtiss Carrier Planes, left together in order to accommodate all the mail. On the first day, two Curtiss Planes left for Field, Dallas, Tex., carrying quantities of mail for Dallas. The next day, the mail was carried to San Antonio, Tex., to be transported over the Government route to the latter two points. After the first three months operation of this route, the N.A.T. reported an average efficiency of over 97 per cent perfect. This was the beginning, for a representative of the general trend of the success of the new mail system. It is the first time that the Postmaster General has signed a contract with a private company to operate an air mail system.

It will be recalled that on the 9th of November, the National Air Transport, Inc., signed a contract with the American Railway Express for the carriage of express by air, operations under which contract will probably go into effect in the near distant future.



These aviation chiefs in Washington. Left to right: Major General Elmore M. Blughan, Army Air Corps. Next Admiral William A. Moffet, Chief, Bureau of Aviation. Right, Major General William M. McCrady, Postmaster General in charge of Air Mail.

transport machine, were of the light commercial class, although some were equipped with 260 hp. Wright Whirlwind engines. Of these two-seater planes, only one failed to complete the Tour, which is certainly a very small percentage considering the time which was carried out to schedule throughout.

Such efficiency and reliability in these machines could never have been possible were it not for the fact that engineers and operators approached the job with a definite attitude of perception that they are magnificently dependable. The most used and most economical engine without doubt is the Wright Whirlwind 260 hp. As record, the reliability of which is peerless in commercial planes in field elsewhere in this time of American. The Whirlwind has set a new standard in reliability of commercial engines.

#### Engine Development

The next high spot in airplane engine development during 1926 was the production of the Pratt and Whitney Wasp, a two-cylinder radial air-cooled engine which develops approximately the same power as a Liberty as a reduction of something like 300 lbs. in dry weight. The same high speed of the engine in 1926 again, and it is very conservatively rated at 400 hp. The engine is built in two forms, one with a 400 cu. in. engine and the other in 500 cu. in. which is a little over 50 lbs. per hp. This engine, developed by the Pratt and Whitney Aircraft Company in close cooperation with the Bureau of Aeronautics, Navy Department, represented one of the most important steps in the Navy's policy of equipping its airplanes which go to sea with the best with air-cooled engines. As is now well-known, the Navy's Curtis biplane pursuit plane equipped with the Wasp engine, has surprised all experts.

The engine field is what ought to be called a progressive one for the front engine is always developed from year to year and consequently the airtail progress made from time to time is frequently overlooked. Some years ago, the Curtiss company developed the D-12 engine which immediately set a new standard in high powered water-cooled engines. Since that time the V-3400 at 3000 was developed from the D-32 and this year the V-3400 has been stepped up to the position of the new power, V-1500-700 hp water-cooled engine which is as much an excellent performance as the Schneider Cup race in Hampton Roads last November, in spite of not being a winner and in spite of the bad luck which befell Lieutenant Cuthbert's plane when a faulty gasoline pump caused his engine to stop long dry and let him down just as he was about to finish his

last lap with a perfect performance at a speed of over 220 mph., having done as high as 242 m.p.h. in a previous lap of the course.

The next progress is to be recorded in the case of the Pratt and engine from which, with the 1900 and 3200 engines in a few the models 1A, 2A, and 3A have been produced in addition to the inverted engine, all of which are in regular use.

#### The Polar Flight

It was with this standard of equipment that Lieut. Comdr. Hartnell B. Ellington, U.S.N., set out from New York on April 9, at the St. Louis Chamber of Commerce, with an engine equipped with three Wright Whirlwind engines for Spokane from where he planned to attempt a flight to the North Pole and back. The story of this memorable flight of a trip over 35,000 miles in three weeks which earned Commander Byrd and his companion and pilot, Floyd Bennett, to the North Pole has been told repeatedly and is needless to tell all. It will never die and the flight represents only one of the many great achievements of the day, not only from the standpoint of human endurance, but also as an example of the possibilities of flying in all parts of the World.

It is always interesting to recording such achievements as have been described in this article, that many, comparatively, have but certainly equally important factors due to necessity entirely neglected. For example, in spite of the excellent condition of the Whirlwind engines when set without a further reduction of the weight of the engine, pilot and load, this could never have been possible had it not been for the fact that these engines were equipped with magnates of the reliability of Beaufort teeth, so that when every Whirlwind engine is fitted, in addition to their magnets being standard equipment in every other engine manufactured in this country, almost without exception. These magnates are older than 1926, in fact, but their development has been under of those conditions.

Incidentally, with other equipment such as propellers—Curtiss-Bell metal propellers, aluminum propellers, Standard Steel propellers, all have undergone development during the year just, hence as they are in early existence now, leave a place in my discussion on technical progress.

#### The Future

The future is for留 the scope of this discourse. Yet, because of the far-reaching effect upon the future, use of the most important landmarks in aeronautical progress during the past year has perhaps been left until the last. Reference is



The first plane to carry and under post office contract. The start of the Ford-Stratels mail plane from Detroit with mail for Cleveland, Feb. 18.



The first mail plane, Curtiss biplane, 'Sam Francon', flying over the Mississippi River, May 12, 1926.

made to the creation of the Daniel Guggenheim Fund for the Promotion of Aviation. On Jan. 16, 1926, Daniel Guggenheim, president of the Guggenheim Institute of Technology at New York University, wrote a letter to Secretary Hoover announcing his desire to create a fund of \$3,500,000 for promoting aeronautical education in colleges and among the general public, for establishing fundamental aeronautical research; developing commercial aircraft and equipment; and furthering the use of aircraft in business. During the past year, the world wide interest in a fund of this kind caused by Dean Abbott H. Low, of the U.S. Naval Academy, and a recommendation of Harry T. Guggenheim, son of the donor, has influenced several schools at California Institute of Technology and Leland Stanford University, both of California, and Miskogas University, Asmara, Eritrea, to add, in addition, the Fund has published from time to time a very valuable bulletin on aeronautical progress. Reducing the damage which can be done by the sudden disposal of large amounts of aircraft in the event of another international war. That said from the beginning, adopted the policy of concentrating with the greatest energy, financial and as a result there is no doubt that Daniel Guggenheim's gift to aviation is destined to have a far-reaching and permanently favorable effect upon aeronautical progress.

It is hardly possible fully to appreciate the progress in all phases of aeronautics which has been made during the past year. And the importance of 1927 can be measured only with like precision. The year just entered will undoubtedly see a firm and sound system provided in both service and civil aviation built upon the steely foundations already laid.

#### Pan-American Flight Starts

The Pan-American Flight, of the Air Corps, postponed a day because of unknown weather, started at 10:30 a.m. Dec. 21. Major Herbert A. Dargan led the first of the six Boeing Aeroplano planes to the "Sam Francon." The remaining planes were sent out from Kelly Field by two other planes, one of which, Major Gen. Mann P. Macchio.

Several hours before flying off for San Antonio the planes circled the field and then flew over the city and after which they headed for Fort Bliss, which they reached safely. They flew on to Aviacion, the "Sam Argentine" is a right hand position next to Major Dargan's right. On the left was the "Sam Francon," and to the right of the "Sam Argentine" was the "Belvedere." To the left of the "Sam Francon," the "St. Louis."

Just before the flight began, messages from Secretary of War Davis and Assistant Secretary of War for Aviation

Toebeck F. Barron were received, wishing the three "St. Louis" speed and a happy landing.

At 9:30 p.m. Dec. 22, the planes landed at Houston Field, Texas, and the "Sam Argentine" in the first leg of the flight.

The planes had been organized at the field in the early morning, but a fog delayed their departure from Fort Bliss until the early afternoon of Dec. 22. The 390-mile journey was made in 3 hr 45 min as the face of a strong head-wind. Several thousand people were present while the planes landed, including officials of the Mexican Army and Navy, and a reception committee of Americans headed by the American Consul. A banquet was telephoned to the pilots during the evening.

At 8:30 p.m. Dec. 23 Capt. H. C. Barker and Lt. L. D. Pritchard, in plane, "Sam Argentine," left for Yuma, Ariz.

This was the second leg of the 600 miles that took off at Tucson to reach the former city. The "St. Louis" was forced to land because of engine trouble and the others returned to the ground shortly after the start by order of Major Dargan.

The soft character of the ground at Houston Field made it difficult for the planes to take off. The "Sam Francon" started over the field with the others, but was lost in the smoke and the others followed in the order of departure, the "St. Louis" made a forced landing in the river and was returned to the river mouth, from which place it took off and returned to the field.

As soon as it became known that the "St. Louis" had been forced to land because of a damaged engine, a Wright engine and other spare parts were sent to Tucson from Dallas Field, San Antonio. Major Dargan dispatched a telegraph to the War Department, Washington, D. C., and the "Sam Francon" was forced to land in Yuma Creek, the river where they stay at Tucson until the "St. Louis" was repaired.

Major Dargan, Captain McDonald, Lieutenant Washington and Captain Edder, bearing President Coolidge's good-will message to President Cárdenas of Mexico, passed Mexico City by Dec. 25. They were met by Col. Edward Davis, with authority to add the American Embassy, Major Harold Thompson, assistant military attaché and Lt. Col. Claude Donald Hamilton, the naval attaché. The men were entertained at luncheon by Colonel Davis and at dinner by Ambassador Bradfield.

In expediting his departure from the rest of the planes at Tucson, Captain Edder said that some trouble developed with the engine of the "Sam Argentine" and Lieutenant Washington piloted the plane. Ten minutes after the plane took off he found that he had sufficient time only to reach Vera Cruz before night fell. He informed the other planes were ahead of him.

# The Development of the Curtiss Hawk

*Curtiss Pursuit Planes for Army and Navy Developed Along Specialized Lines.*

THE CURTISS Aeroplane & Motor Company, Inc., has developed the Hawk pursuit plane so that the basic type is adaptable to many power plant installations and the production and maneuverability are maintained. This was the idea that provided the basis for the Hawk with a de Havilland engine mount, allowing for the quick replacement by one power plant with another.

Years of service have proved the practicability of the basic type of D-22 engined Hawk, its rate up by the U.S. Army and Navy showing the soundness of this theory. Four different power plant installations are now available on the Hawk, each resulting from being applicable to a special part of the Army and Navy type requirements. The Curtiss D-22 Hawk will be the standard pursuit type of the Air Corps, but the demand of the service has also encouraged the development of lower powered Hawk for pursuit training. The Navy, while using the standard D-22 type, has stimulated also the production of an unpowered Hawk.

The Glendale City plant of the Curtiss Aeroplane & Motor Company, Inc., has been engaged in the production of P-12s. This is the latest Army specification of the D-22 Hawk. One of the more basic changes in the earlier P-1 and P-1A, the P-12 incorporates many improvements and changes, represented as the result of service tests. The old style twisted type of propeller has given place to the R type of forged German Steel metal propeller. This new type of propeller insures greater strength and longer service and possesses all the advantages of the twisted type. The unloading gear was redesigned, having been changed so that there was decreased oil leakage and vibrations are absorbed. The radiator has been made longer and the shape changed to facilitate better rate of the feeding flow. These changes have increased the speed of the Hawk by two miles per hour. The use of 32 in. by 6 in. wheels and tires in place of the 26 in. by 4 in. ones has greatly improved the landing gear, and the steel prop has been fitted with an auxiliary tail which is an advantage in nose-down and nosed-up flying. The fuselage has been strengthened with spans for the installation of gasoline tanks and radio equipment and a reduced loadings have been installed to take the new power plant type instruments. A redesigned seat, a lengthened control stick and a change in the location of the throttle will add to the comfort of the pilot.

## The Training Hawk

The pursuit training plane, the AT-4, is another Army modification of the Hawk. One of these planes underwent military Air Corps tests, and is now under production at the Glendale City plant of the Curtiss Company, to fill a production contract with the Government. This plane is a P-12, with the exception of the following: It has a 150-hp. Wright 120-hp. Wright engine having been made to replace the D-22 engine of 320-350 hp. The AT-4 is a splendid training plane, giving a fine performance and possessing an unusually high degree of maneuverability. As a modification of the basic Hawk type there is an absence of low power limitation in the case of the AT-4. The standard D-12 power plant can be easily replaced by the AT-4, thus allowing the training plane to be easily converted into a fighter Hawk. A four J-2 six-cylinder engine, which will give the AT-4 a slightly higher performance than that of the regular AT-4, but will be identical in all other respects.

The Navy has now adopted the Curtiss Hawk, and there are under construction at the Buffalo plant of the Curtiss Company, a quantity of the PFC-3 type. Heretofore, the Navy has used only low-powered flying planes. Some of

the PFC-3s are provided with the regular wheel type landing gear and others with a special deck-landing undersurface. These are all to be equipped retroactively with twin fins, which are furnished as spares. These Navy Hawks are similar to the Army type with the exception of the landing gear and the stainless steel instead of the black finish.

## The Air-Cooled Pursuit

The Buffalo plant of the Curtiss Company is about in full production another modification of the Hawk, which will be known as the Navy PFC-4 type. The Navy has been aiding the development of air-cooled engines, because it has been more trouble than the water-cooled propeller aircraft for the Army and Navy. The Curtiss D-22 Hawk will be the standard pursuit type of the Air Corps, but the demand of the service has also encouraged the development of lower powered Hawk for pursuit training. The Navy, while using the standard D-22 type, has stimulated also the production of an unpowered Hawk.

The Glendale City plant of the Curtiss Aeroplane & Motor Company, Inc., has been engaged in the production of P-12s. This is the latest Army specification of the D-22 Hawk. One of the more basic changes in the earlier P-1 and P-1A, the P-12 incorporates many improvements and changes, represented as the result of service tests. The old style twisted type of propeller has given place to the R type of forged German Steel metal propeller. This new type of propeller insures greater strength and longer service and possesses all the advantages of the twisted type. The unloading gear was redesigned, having been changed so that there was decreased oil leakage and vibrations are absorbed. The radiator has been made longer and the shape changed to facilitate better rate of the feeding flow. These changes have increased the speed of the Hawk by two miles per hour. The use of 32 in. by 6 in. wheels and tires in place of the 26 in. by 4 in. ones has greatly improved the landing gear, and the steel prop has been fitted with an auxiliary tail which is an advantage in nose-down and nosed-up flying. The fuselage has been strengthened with spans for the installation of gasoline tanks and radio equipment and a reduced loadings have been installed to take the new power plant type instruments. A redesigned seat, a lengthened control stick and a change in the location of the throttle will add to the comfort of the pilot.

## A Radiator Manufacturer's Change

On Jan. 1, 1927, the Winchester Repeating Arms Company, of New Haven, will acquire the Radiator Division of the United States Carburetor Company. The United States Carburetor Co. will operate the radiator division, the use of carburetor name and carburetor sales, and practically all of the U. S. Army and Navy water-cooled planes are equipped with U. S. Carburetor carburetors.

The Winchester Repeating Arms Company plans to develop aggressively a market for carburetor radiators and cores and cores. The entire radiator organization is being transferred from Lowell to New Haven, thus assuring the trade of the best kind of carburetor cooling material that has always prevailed in the past. Harry E. Jakobs will continue as Sales Manager of the Radiator Division.

## Investigation of Air Pressure

Pressure of Air on Coming to Rest from Various Speeds, forms the subject of report 267, by A. F. Zahm.

The text gives theoretical formulas from which is computed the fact for the pressure of air on coming to rest from various speeds, such as those of aircraft and propeller blades. Pressure graphs are given for speeds from 1 in. sec. up to 1000 ft. per second.

The report, which is slightly modified, was prepared for the Bureau of Aeronautics, Navy Department, Feb. 27, 1925, and it was selected for publication by the National Advisory Committee for Aeronautics.

A copy of this report may be obtained upon request from the National Advisory Committee for Aeronautics, Washington, D. C.



The Navy Curtiss Hawk pursuit plane, Mark PFC-4. The engine is a 300-hp. Pratt & Whitney "Wasp."



The lower type of Hawk pursuit plane. The Army Curtiss P-12s developed from the P-1 and P-1A. The P-12s are the standard pursuit type of the Air Corps. D-22.



The Hawk amphibian. The Navy Curtiss PFC-3 pursuit airplane is another development of the P-1. As in the P-1, the engine is a 300-hp. Pratt & Whitney "Wasp."









### The First Airplane Factory in Argentina

The cornerstone for the first airplane factory in Argentina was laid on Nov. 18, 1926, at the city of Corrientes, Province of Corrientes. The ceremony was celebrated by Army and civil air commissioners and signing of the contracts for the seven year construction work.

The factory is to be situated in character, on first purpose built land. The factory will be equipped with the equipment to meet all needs. The factory will, however, be open to manufacture other aircraft planes for civilian customers as well as for the Argentine Government.

It is estimated that the plant will be able to construct complete airplanes within three years. The Argentine government has acquired patent rights for Lorraine Deltach engine, and for two years these will be only assembled in Argentina. The amounts at this date are not known as to whether the complete engine may ultimately be built in Argentina. The first planes will be of the French Breguet type. The planes already built with constructional names in Argentina.

### Details on the Egypt-India Air Service

The British Air Ministry has announced that aeroplane services are being made for ground forces and members of parliament along the route from Cairo to Peshawar, India. The landing fields will be given by the Air Ministry, while the Imperial Airways, the operating company, will be responsible for providing the requisite personnel and any other ground services.

The British Air Ministry estimates that, should the maximum annual subsidy of £10,000 or approximately \$45,000 be granted, and should the other expenses be paid by the operating company, the cost of the new line will be £12,000 a month, or the total cost to the Government of the new line for the first five years will be slightly over half a million pounds sterling.

Co-coordinated with the establishment of the Egypt-India air service it is reported to be proposed to abolish the present fortnightly Egypt-India mail service, the plan being to carry every mail on the new line.

### Sweden and Holland Make Air Treaty

An air traffic convention has been concluded by Sweden and Holland, and the port ratified by both countries. The main provisions of the convention are:

Each state in time of peace grants to duly registered air mail contractors the right to fly over its territory.

Subject to the conditions established by the convention territory is understood to include territorial waters.

Free or special services, expenses of the contracting parties can be flown over at any time.

Airpostes and airports opened to public will be available to aircraft of both states.

Subject to certain regulations, the aircraft must bear certain identification marks, the details of which are provided and the rates of remittance of air mail are to be determined.

The aircraft must carry a prescribed amount of cargo.

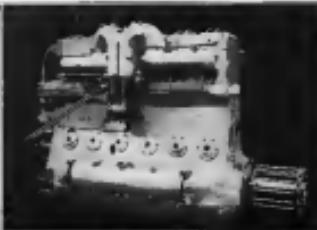
Cargo must be transported in a prescribed manner of carriage.

Commercial transportation of merchandise and passengers within the territory of the contracting parties is reserved for aircraft irrespective of nationality, etc.

The contracting parties can determine the duration of stay following three month's notice.

### Beaumont Heavy-Duty Engine Completed

Beaumont Beaumont and Co., Bradford Works, Glasgow, England, have built the first of three new heavy-duty aircraft engines. On the Model, the six-cylinder engine, rated at the Critical Mark 11, developed 350 h.p. at its normal speed of 1,750 r.p.m. and a maximum of 380 h.p. at 1,980 r.p.m., with a total consumption of 45 lbs per horsepower-hour. While the company will not divulge the size of the larger engines, the engine was built, it is understood to be a Hispano-Suiza. It is estimated that the plant will be able to construct complete airplanes within three years. The Argentine government has acquired patent rights for Lorraine Deltach engine, and for two years these will be only assembled in Argentina. The amounts at this date are not known as to whether the complete engine may ultimately be built in Argentina. The first planes will be of the French Breguet type. The planes already built with constructional names in Argentina.



The Beaumont Cygnus Model B, 350 h.p. engine

The company has given the following details:

Rate	Speed
Normal	17 m.p.h.
Emergency	16 m.p.h.
Ground speed	16 m.p.h.
Flight weight	16 m.p.h.
Flight weight with 100 lbs. of fuel	16 m.p.h.
Flight weight with 200 lbs. of fuel	16 m.p.h.
Flight weight with 300 lbs. of fuel	16 m.p.h.
Flight weight with 400 lbs. of fuel	16 m.p.h.
Flight weight with 500 lbs. of fuel	16 m.p.h.
Flight weight with 600 lbs. of fuel	16 m.p.h.
Flight weight with 700 lbs. of fuel	16 m.p.h.
Flight weight with 800 lbs. of fuel	16 m.p.h.
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## The Department of Commerce Issues Final Civil Air Regulations

### A Resumé of the Regulations Which are to Govern Civil Air Activities.

THE DEPARTMENT of Commerce has just issued the final draft of the regulations governing commercial aviation, and these regulations become effective on Dec. 31, 1926. The complete document is of such importance that every pilot will find it necessary to obtain a copy, and aviators will only attempt to give a synopsis of the principal clauses.

This is the third time the regulations have been drafted. The first draft was widely distributed and numerous hearings were held in Washington, and the views of the various branches of the industry must be considered. Special conferences were held for manufacturers, airlines, operators, mail service operators, insurance groups and publishers. As a result, the originally suggested regulations were greatly modified and simplified. Assistant Secretary of Commerce MacCracken, at hearings, adopted a very liberal attitude and endeavored to be led by what was best for the industry, rather than by considering the most difficult clauses. The second draft of the proposed regulations was not so widely discussed but the American Chamber of Commerce appointed a committee to consider these revised regulations and found only four or five clauses which it considered should be modified. The Department of Commerce has incorporated several of the suggested changes in the final draft, and will make those they have left firm.

The regulations are the result of the "Air Commerce Act of 1926" which was drawn up "to encourage and encourage the use of aircraft in commerce, and for other purposes." This bill placed the regulation and enforcement of commercial aviation under the Department of Commerce. Due to constitutional limitations on the Federal Government by law, and, therefore, the regulations apply only to interstate commerce or the operation of aircraft for profit between states.

To prevent the use of aircraft for profit between states, the regulations require that all aircraft which operate flying within the boundaries of a state must do so entirely over private flying between states, where such flying is not of a commercial nature. The only clause which affects flying within a state is that which requires every plane to have a number painted on the underside of the lower wing and a small number on the side of the fuselage.

#### Licenses and Log Books

The main provision of the regulations is that which requires the registration of all planes used in "Air Commerce," after planes have obtained airworthiness certificates. This latter calls for both structural analysis and flight testing. All planes which are registered must be registered, however, for which preliminary inspection is required. In addition, a demonstration of ability to pilot on command, are necessary. The regulations define air traffic rules and the necessary signals which should be displayed at night. Log books and periodic inspections are prescribed. All new airplanes, all airplanes after a major crash and all planes where the owner

there has been modified must be flight tested before an inspection prior to their being licensed. The regulations also require that each plane must be registered and that the owner will have the right to inspect all licensed planes at any time. The inspection will see planes in traveling to and from the various fields where inspections are to be made.

#### Planes Requiring Licenses

According to the regulations, the airplanes which must be registered and for which licenses must be obtained are those carrying persons or property for hire, or the United States.

(1) Between two or more states, or to or from foreign countries, or to or from the District of Columbia, or from the United States, or to or from the District of Columbia, or from the United States, or to or from any part of Pennsylvania, and back again.

(2) Between two points in the same state if a part of the flight is made to or from the District of Columbia, or from the District of Columbia, or from the United States, or to or from any part of Pennsylvania, and back again.

(3) Between two points in one state, if it is a part of a nonstop carriage between points in different states, or countries, or from the United States, or to or from any part of Pennsylvania, between two airports and foreign, or to or from the District of Columbia, or from the United States, or to or from any part of Pennsylvania, and back again.

(4) Within the districts over the District of Columbia or any state or provinces, or in different states, or countries, or territories, or provinces, or in the District of Columbia, or from the United States, or to or from any part of Pennsylvania, and back again.

(5) For the operation in the vicinity of a seaport, as where the port is in one state, or in one country, or in one territory, or province, or in the District of Columbia, or from the District of Columbia, or from the United States, or to or from any part of Pennsylvania, and back again.

(6) For the operation in the vicinity of a foreign port, as where the port is in one state, or in one country, or in one territory, or province, or in the District of Columbia, or from the District of Columbia, or from the United States, or to or from any part of Pennsylvania, and back again.

(7) For the operation in the vicinity of a foreign port, as where the port is in one state, or in one country, or in one territory, or province, or in the District of Columbia, or from the District of Columbia, or from the United States, or to or from any part of Pennsylvania, and back again.

The regulations further provide that: "When civil aircraft of the United States are permitted to fly in or over a foreign country without registration and return and landing of their passengers, or staying over on foreign country, and a part of the flight is made to and from the United States, or to or from any part of Pennsylvania, and back again, the aircraft must be registered, may operate in the territory over which the United States has jurisdiction, without limitation. Such foreign aircraft shall not engage in intrastate or interstate air commerce."

#### Obtaining Licenses

An aircraft will not be licensed until it has been registered and found airworthy. Only planes owned by a citizen of the United States or by a corporation controlled by American citizens, or by a foreigner, and that would not be registered under the laws of any other country.

"For airplanes constructed prior to July 1, 1927, and found by the Secretary of Commerce to be of poorer design, economy and workmanship, and of suitable materials and equipped in accordance with these regulations, aircraft is



A lineage of commercial planes (biplane) will be seen Kingbird (DK 9) three-place plane in the middle.

## We GUARANTEE To Teach You To FLY

### EVERY STUDENT A PILOT—NO CLASSES—INDIVIDUAL INSTRUCTION

#### CONTRACT FOR COMPLETE EAGLEROCK FLYING COURSE

THIS AGREEMENT entered into this \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_,

between \_\_\_\_\_ and the BENNETT EAGLEROCK SALES CO.,  
Richards Field, Kansas City, Missouri

For the sum of \$300.00, \_\_\_\_\_ cash in hand receipt of which is hereby acknowledged.

THE BENNETT EAGLEROCK SALES CO. agrees to give the student \_\_\_\_\_

the following flying instruction, landings, take-offs and practice, totaling 15 hours, one of which shall be solo, (student must practice to the point of skill, and instructor will not be liable for loss for him to solo, for which he will be given 1 hour solo flight). All instruction shall be given in Eaglerock or other modern Airplanes in good flying condition. All instruction by competent pilots experienced in giving instruction in the art of flying.

All instruction in ground school, motor aeronautics; instructing, relaying and repairing of Airplane tires. On completion of course student will receive a certificate duly signed by Instructor and President of Company, certifying to number of hours in solo and solo as a flyer.

Student agrees to take instruction at such time and as often as instructor deems advisable.

This Field is under Government Supervision, used by Army and Air Mail.

CANCELLATION.—This Contract may be terminated by the BENNETT EAGLEROCK SALES CO. for inaptitude or lack of sufficient application on the part of student. All tuition in excess of \$50 per hour shall be retained to student and this contract shall be null and void.

Student desiring to discontinue the course may do so by notifying the President in writing after which, tuition in excess of \$50 per hour will be refunded.

Student excused for drinking, gambling or other unbecoming conduct will be assessed \$25 per hour for each time above given.

This contract shall be binding on both parties when signed by student and the President of the BENNETT EAGLEROCK SALES CO.

BENNETT EAGLEROCK SALES CO.  
Down Town Office 223 West 12th Street, Kansas City, Mo.

President \_\_\_\_\_

Student \_\_\_\_\_

Secretary \_\_\_\_\_

Chief Representative \_\_\_\_\_

FILL IN THE ABOVE CONTRACT AND MAIL WITH DEPOSIT OF \$100.00. STUDENTS WILL BE ACCEPTED IN ORDER IN WHICH CONTRACTS ARE RECEIVED.

WE GUARANTEE SATISFACTION.

#### WHY WE CAN OFFER YOU THIS LIBERAL CONTRACT

WE OPERATE RICHARDS FIELD, USING SAFETY FIRST EAGLEROCK AIRPLANES. OUR PILOTS HAVE HAD YEARS OF EXPERIENCE GIVING FLYING INSTRUCTIONS.

We furnish Free Transportation to and from field. Good board and room can be obtained for \$7 to \$8 per week.

**"EAGLEROCK"** the only Airplane good enough to sell on Time  
—Ask about our Time Payment Plan—

The only school using  
New EAGLEROCK  
Airplanes exclusively  
for training students.

The only Flying School  
in the Middle-west on a  
Government Supervised  
field. Where every  
type of Airplane can be  
seen in operation.

The only Flying School  
where students are re-  
funded unearned tu-  
ition.

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ances will be issued after such airplanes have passed the flight tests held on *anywhere*.

#### War Supplies Can Obtain Licenses

It is understood that the department, under the above clause, will grant noncommercial certificates and licenses to war surplus planes such as Jeeps, Shermans and Gardecs without the owners furnishing a stress analysis provided the plane is in good condition. In any case, such planes can be used for commercial purposes within our state even if they do not obtain a license, assuming, of course, that this analysis do not obtain a license, assuming, of course, that this analysis

For airplanes manufactured after July 1, 1951, very detailed specifications must be furnished to the Ammunition Branch, Department of Commerce, and the technical word must meet specified requirements and the complete stress analysis must be furnished, indicating the required safety factors. A plane must also have certain durability qualities to be established by formulas and by flight tests. The foreword, however, may be changed to a noncommercial or domestic. Once the airworthiness certificate has been obtained for a given type of plane, the manufacturer can continue building planes of the same type but a flight test of every new plane must be made in the presence of an inspector either by the manufacturer or by the purchase of the machine.

To qualify for a type noncommercial certificate the wing stress stress analysis must show that a plane has safety factors as follows:

Weight of Plane	Wing	Span	Deflection	Time
	Stress	Indicators	Flight	Flight
Class 1-type up to 5,000 lb.	2.5	4.0	1.5	1.5
Class 2-type up to 10,000 lb.	3.0	4.0	1.5	1.5
Class 3-type up to 15,000 lb.	3.5	4.0	1.5	1.5
Class 4-type up to 20,000 lb.	4.0	5.0	1.5	1.5
Class 5-type up to 30,000 lb.	4.0	5.0	1.5	1.5
Class 6-type up to 40,000 lb.	4.0	5.0	1.5	1.5
Class 7-type up to 50,000 lb.	4.0	5.0	1.5	1.5

For aircraft with horizontal tail surfaces must be designed to withstand a load of 15 to 20 per cent of the weight of the plane, depending upon the weight of the plane. The vertical tail surfaces must be capable of carrying 70 per cent of the load applied to the horizontal tail surfaces. The controls must be designed to withstand 300 lb. free and 400 lb. deflection (or 250 lb. applied to the Drog wheel) while the rudder control must withstand 200 lb. These figures may be modified where the control surfaces could not apply these loads as might be the case in a lightplane.

#### Flight and Loading Gear

The landing gear must have load factors equal to those for the wings and the horizontal tail. The load factors for level loadings are 6.5, 6.5, 5, 4.5 for airplanes up to 10,000 lb. to 20,000 lb. respectively. Landing gears must be designed to carry a static load of 1.5 times the weight of the airplane sitting in either direction and applied to one wheel at the sole. A landing gear must be constructed to withstand in strength with the fuselage under loading conditions. It must also be designed to withstand a maximum drop not varying from 30 in. for class 1 aircraft to 100 in. for class 7 aircraft.

Controls, according to the regulations, must have verification, adequate values for the pilot and reasonable protection against propeller breakage. Closed canopy seats must be at least two inches and "dead" controls on airplanes carrying passengers for hire or reward shall be so constructed or arranged as to prevent passengers from interfering with the course of flight of the airplane.

Airplanes must be equipped with firewalls or the equivalent, which must be provided with glands or gaskets when passed by propeller, engine, carburetor, intake, heat exchanger, fuel and auxiliary tanks and auxiliary devices. Separate glands and ignition controls on multi-engine planes must be provided. Fairings covering reserve tanks and gasoline gauges are also in the regulations which definitely ban pressure gasoline fuel systems.

#### Engine Tests

All new types of engines, under the regulations, will have to be bench tested for 50 hr with a full throttle but at 5 hr. All newly manufactured engines of an approved type must be bench tested for 2 hr before installation in an airplane, one-half hour of which must be at full throttle. Ratings which have been issued for more than one year must be rechecked, indicating the required safety factors. A plane must also have certain durability qualities to be established by formulas and by flight tests. The foreword, however, may be changed to a noncommercial or domestic. Once the airworthiness certificate has been obtained for a given type of plane, the manufacturer can continue building planes of the same type but a flight test of every new plane must be made in the presence of an inspector either by the manufacturer or by the purchase of the machine.

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Class 4-type up to 20,000 lb.	4.0	5.0	2.5	1.5
Class 5-type up to 30,000 lb.	4.0	5.0	2.5	1.5
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Class 7-type up to 50,000 lb.	4.0	5.0	2.5	1.5

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A line up of commercial airplanes at the M.A.T. field at Melrose, Ill. An N.A.T. Corps Color Photo



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The 2002 survey indicates that only 20 percent of U.S. adults

mental nervous and grade nervous systems, derived from material nerve or limbic system. These three domains of the brain are the primary source of the development of the organism. At the same time, the nervous system, especially the brain, is the primary source of many higher levels of derived nervous systems, because human nervous system is the primary source of the nervous system of the animal. An alternative view of evolution is that the brain, with time, is the primary source of the nervous system of the animal.

In the case of human experience, the history of human experience is the primary source of the nervous system of the animal. In human experience, the experience of the pilot will be influenced by the history of the animal. A scientist can predict what will be influenced by the history of the animal.

Physical examinations will be held before doctors appear to the Society of Engineers, which include governmental military physicians. The doctors will be removed, except one. Those who have not been flying safely and who wish to obtain better medical training will be given flight training before an inspection. The test for Transport Pilot includes knowledge of air traffic rules, the theory of aircraft mechanics and the theory of meteorology and air navigation.

There are a large number of specific clauses regarding ex-



The Super-Batfish equipped with Wright Whirlwind engine. The class number in which the radial engine fits into the Aerologic series and is needed in parentheses.

## The Most Successful Aero Engine of 1926 is the Napier Lion.

It has proved its superiority for RELIABILITY, EFFICIENCY and SPEED—not in an isolated case, but consistently with standard engines taken from Scores

Four Royal Air Force machines fitted with Napier engines successfully flew from Cairo to Cape Town and back to England, covering 96,000 engine flying miles.

Two twin-engined Royal Air Force Seaplane flying boats, fitted with Napier engines have flown from Plymouth to Alexandria and back, covering 17,000 engine flying miles.

A flight of Royal Air Force Vickers-Victorias machines fitted with Napier engines carried out a flight from Cairo to Aden and back, covering 18,000 miles flying miles.

Major Franco, on a Dornier Wal flying boat fitted with two Napier engines, flew from Spain to Buenos Aires, covering 12,518 cretive flying miles.

The First Prize in the German competition to discover the best commercial seaplane was won by the only Napier engined machine entered—the Henkel-Nämer.

When considering the use of aero engines you cannot do better than follow the lead of the British Air Ministry and select the —

# NAPIER

THE FINEST AERO ENGINE IN THE WORLD

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ENGLAND

figures of eight annual flights, emergency maneuvers, and a cross-country flight of more than 300 miles, unless the pilot can prove that he has made such a flight within a year. The candidate must provide the plane and the expenses set the place and date for the test.

The Private Pilot license test requires only knowledge of air traffic rules, making of the flight of eight hours and three mandatory flight test lessons. License will be issued upon physical examination only. If the Transport Pilot has had 10 hr. solo within 90 days, the Instructor Pilot 25 hr. within one year and the Private Pilot 30 hr. within a year. Otherwise the actual flight test must be gone through for the respective classes.

Mechanics licenses will require knowledge of internal combustion engines, fuel and lubricating oil, aircraft and overhead. The examinations will be held theoretically, practical and the candidate must obtain an average of at least 70 per cent. The license will last two years and will be renewable if the applicant has practiced the trade for at least half the period.

Licenses may be revoked for violation of the regulations or air traffic rules, for unseemly personal conduct or for the possession of intoxicating liquor while on duty.

#### Air Traffic Rules

Crosses air traffic rules are laid out. Airplanes taking off must give way to planes landing. Airplanes must give way to seaplanes and seaplanes to seafarers. Aircraft when possible must keep to the right of an aviator. Three-hundred feet is the minimum distance within which an aircraft may move to another. The amount having another aircraft on its right is 100 feet. The amount having another aircraft on its left is 150 feet. The amount having another aircraft above is 100 feet. The amount having another aircraft below is 150 feet. When two aircrafts are approaching head on, they both keep to the right. The overtaking aircraft must avoid the craft that is passing by keeping to the right and not by allowing its altitude.

When flying over congested areas, the altitude must be sufficient to allow a reasonable safe emergency landing being made and must not be less than 1,000 ft. Elsewhere, an altitude of 500 ft. must be maintained except, of course, for landing or such operations as crop dusting or sprayed

limitations are put on flying over oceans, especially as the case of start flying. No starting is allowed to be done when carrying passengers (these regulations, it must be remembered, apply only to licensed planes).

Seaplanes must follow the laws governing water craft when on the surface, as relative to the air regulations. Landings when possible, must be made at least 100 ft. and the airplane must be at least 100 ft. above the water when making the test of the seaplane. The landing machine has the right of way over planes on the ground and over planes at a higher altitude.

Provisions are also made for lights on aircraft flying at night and a standard of distress, weather and field markings is laid out.

#### Penalties

Under the provisions of the law, violation of the regulations as established by certain civil aviation mostly in the shape of fines set to cover \$500. Violations will be reported to the Government authorities and "the Secretary of Commerce will notify all persons of the occurrence of such penalties and the person charged with the penalty may transmit to the Secretary of Commerce any opinion of an attorney as to the facts upon which the penalty was incurred, with a request for mitigation or remission." The Secretary of Commerce may determine whether or not the penalty will be waived or remitted, and the Secretary of Commerce may waive any of the requirements of these regulations when in his discretion, the particular facts justify such waiver."

Finally, it is stated: "These regulations shall take effect midnight, Dec. 31, 1926. Aircraft and engines subject to these regulations may continue to operate without a license until July 1, 1927, and the application for license is filed with the Secretary of Commerce prior to March 1, 1927, and the Secretary of Commerce has not acted thereon."

The committee over 1500 unengaged planes and it has been impossible to negotiate this classiness in fall. The task is now concluded and it is extremely difficult to summarize the regulations without leaving out important details, so perhaps, we might the warning: Be kept, therefore, that all makes of American will obtain copies of and study the regulations.

#### Pilot Visits Canadian Jail

An solo of the National Air Races at Philadelphia has just now postponed the race department of Aviation. The story apparently received no circulation at the time, likely due to the well known nature of the pilot involved, who only gave as the details in a casual manner to illustrate the popularity of the state. Bellanca with Lawrence 3 cycle engine which was in the open at 60 hp. D. C. Chamberlin, at Hockessin Heights, N. J., has been flying on some eight or nine years.

Chamberlin, with Mrs. Chamberlin as passenger, had flown down the Jersey Coast from Hockessin Heights headed for the air races at Philadelphia, where he was entered in two of the lightplane events. Arriving at Camden, N. J., around the 20th, Mrs. Chamberlin was unable to find a place to land and settled. The only landing place suggested to her is a vegetable garden within a walled enclosure. Chamberlin made it and set out the Bellanca down without incident in a patch of grass. Then there appeared from all sides a number of rather rough looking youths, some in school uniforms. He had landed in the enclosure of Condes City Jail.

Others with mixed thoughts also hurried about. It took him half an hour to get out of the jail after a few words with the inmates selected and chamberlain suggested to replace the punctured carburetor float which had caused the uncontrolled visit to the Condes City Jail. Rose thereafter Mrs. and Mrs. Chamberlin took off from the jail enclosure in the accompanying shower of the inmates.

Chamberlin arrived at the air races two hrs. late for the first lightplane event, but in the second secured third place with his model Bellanca in competition with several modern plane.

#### Canadian Vickers Air Activities

The Canadian Air Board has decided to standardize on the Superb 10 as the main point in their production. The Lox 10 is an increased rated engine of seven cylinders, developing 380 hp. by and is built in England by Armstrong Siddeley Motors Ltd. As a result, the two-engined Flying Boxkite and the single-engined pusher have Vessons are having their engine block redesigned to fit the new engine. This work is now in progress. Canadian branch of Vickers Ltd. which is located at Montreal. Work is in the Vickers plant on these planes. This plane is a general purpose sales plane with a novel form of cantilever wings which requires no wires. Canadian Vessons are also producing a single-engine monoplane model Bell flying boat which will be fitted with a Siddeley Great of 60 hp. In addition, work has been started on a bienganged photographic seaplane which can also be fitted with wheels or skids. A single-engine float plane for use on either land, water or snow is in the order way.

#### Proposed Air Mail Service in Canada

The situation of planes for an air mail service in Canada at the Imperial Conference, held in London, England, has ended much interest throughout the Dominion.

The special features of the suggested service are the mailing of express mail from Peter Port, Que., just above Rimouski, to Montreal, Que., and thence to other points. In the winter months, mail could be carried from Halifax, N. S. and St. John, N. B., winter ports, to Montreal, Que., and Toronto, Ont.



## Travel Air Announces

# REDUCED PRICE on OX-5 Model

Now \$2785

At this time, the close of our second year, we are pleased to announce this substantial price reduction on our regular OX-5 plane, effective at once.

There is to be no wavering from the high standard of Travel Air quality, each plane being guaranteed to conform to Aeronautical Safety requirements.

The lower prices are made possible by volume production, for truly the 1926 achievements of Travel Air planes have necessitated an expanding production schedule.

Watch Travel Air development in 1927 from the cockpit of *YOUR OWN Travel Air*.

Ask for latest catalog and new price list. Gladly sent on request.



# The Johnson Twin-60 Airplane

*A New Two-Seat Twin-Engine Lightplane for Commercial or Private Flying.*

THE JOHNSON Twin-60, a twin-engine low-powered commercial and private twin-seat two-engine airplane, has been produced by the Johnson Airplane and Supply Company of Dayton, Ohio, to fulfill what the organization, which has had extensive experience in the demands of commercial flying, has long been seeking. The machine appears to be designed along somewhat radical lines but incorporates many most desirable features. The Johnson company has been led in the construction field, in order to increase reliability in operation, at least two engines are necessary in a machine of this type and at the option of the company, there is a machine of two engines which can make the airplane an even more economical proposition to the amateur pilot to purchase, and he appears to have received his point in his letter design. The machine is equipped with two 32 hp. twin-cylinder French aeroengines.

Another important consideration was that of visibility and comfort to the occupants of the plane. These two requirements led to the selection of a pusher type of machine. The result of all this thought and development work has been the production of a commercial plane of unusual merit from which, when viewed in the light of modern practice, has surprising and truly steady in general design some of the early pusher airplanes.

#### Construction

The structural details of the Twin-60 are as follows: The wings are of wood construction, the lower being round spar and of plywood. Wings type truss is employed. The bracing of the wings is formed of tubes. A series of four, are fitted on all four wing tips with control cables passing through the lower wings, the lower surfaces being connected to these on the upper wing tips by means of streamlined struts. Bell bearings are provided for the control cable pulleys. According to the manufacturer, no differential control between up and down operation of the ailerons is necessary owing to the precise balance of the machine.

The fuselage is entirely of welded steel tubing, no wires, fasteners, bolts, or rivets being used, with the result that the framework is very rigid and safe for future modification.

There is a side door provided for ease in entering or leaving the plane and the structure is strengthened under this door by means of a gusset.

The two cockpits, in broken, are very roomy and give excellent visibility due to their positions. There are no rear view mirrors in either cockpit, these being provided for the rear view by a small window. Dual control is provided, with facilities for the removal of the control mechanism from either cockpit. A feature of the control system is the wheel brakes. Brake pedals are provided actuating the brakes on each wheel individually.

#### Individual Engine Units

The engine instruments are located on their respective engine mounts, and are close enough to the pilot to be easily read from his cockpit. This form of installation of engine instruments eliminates the complication of long shafts and piping systems which add considerably to the possibilities of trouble and difficulty. The engine instruments are mounted on each engine, and it is possible either to keep operating with one normal condition but arrangements are provided whereby the throttles are, if need should arise for full power, to be opened in their lowest. The throttles are situated on the left side of the cockpit and the engine may be controlled separately or in unison.

The tail surfaces are of welded steel tubing construction. The outer span of the stabilizer is written the mounted propeller shrouds and, as will be seen, the propellers are mounted on the outer span. It is reported that the control of the plane is very light and easy and yet the machine has the feel of a large heavy plane, though small effort is required to secure quick response. The mounds are of sufficient size to enable turns to either side being made on one engine.

The new Johnson pusher dual wheel plane is fitted with a standard side type of landing gear. The transverse bearing and brake control bar in the place of the rear undercarriage struts, the foreword struts being provided with compressed air shock absorbers, and the rear struts with air bags. The rear wheels are a special Johnson design and may be operated by the pilot in either, or, as already mentioned, individually. The rear Johnson brake changes the wheel so it is a wheel and is free from



A three-quarter front view of the Johnson Twin-60 two-seater commercial plane (two French 32 hp. engines).

# The 1927 SWALLOW

**AMERICA'S FINEST COMMERCIAL AIRPLANE**

Designed by W. M. Stearman



**\$2,485 - OX5**  
At Factory

The oldest manufacturer of commercial airplanes in America announces a new 1927 model. This airplane is equipped with split axle landing gear, new Hartzell propellers, adjustable stabilizer, streamlined wires and has a reinforced steel fuselage. The high factor of safety is maintained with any motor up to 220 hp. Both cockpits are fully upholstered and have comfortable seating arrangement. The 1927 Swallow has no competitor in quality and performance at low cost. It reflects the stability of a dependable company.

*Watch Swallow Influence on All Airplanes for Years to Come*

**SWALLOW AIRPLANE MFG. CO.**  
WICHITA, KANSAS

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Chicago, IL

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Davenport, Iowa



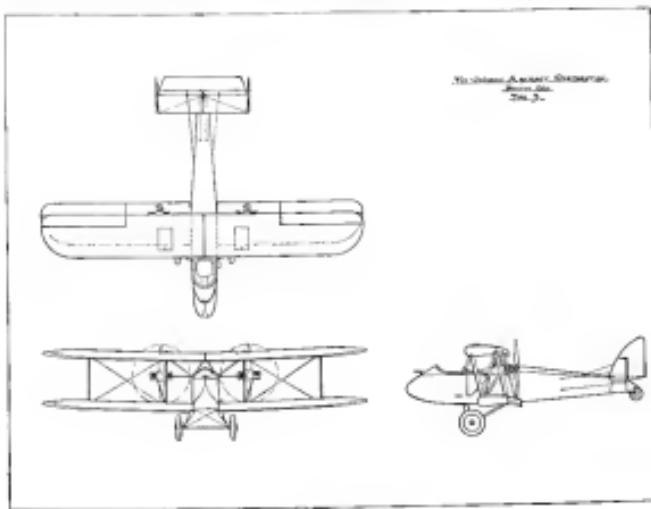
*Another view of the Johnson Twin-60 (See Charr. 32 for engine).*

hand levers, drums, etc. The brake is readily fitted to any type of landing gear and is adjustable so as not to trip the plane up when landing.

In view of the saving of weight in the undercarriage, it was decided that there was no necessity to employ the ordinary tail skid and, nevertheless, this has been eliminated in favor of a small tail wheel. This wheel rotates in an direction and is mounted on compression valveless tires. As a result of this arrangement, one man is able to accomplish the

plane on the field and it is said that the tail wheel enables a quicker take-off and greatly reduces the strains on the fuselage structure in landing.

The engines are already started, see Standard Char. 32 for two-cylinder units. They develop the power of 2800 r.p.m. and can run up to 3200 r.p.m. developing 36 h.p. These engines have passed their reliability and emission of operation both in this country and in Europe and the Johnson company is in a position to supply spare and spare service to all users of



*Control layout drawing of the Johnson Twin-60.*



## AIR-KING

### Greater Strength with Lighter Weight

Durashaken (with the strength of steel and only one-third the weight) is the foundation of this wonderful plane.

Add to this the Durashaken tail group that weighs but thirty pounds; the trussed tube fuselage with no wire rigging to add weight and need adjusting; the Durashaken tube with balsa wood streamline struts that cut down weight, too; the extra strong, shock absorbed landing gear with no heavy winding system; the entire ship stream lined from nose to tail spring tail skid—and no wonder the "Air-

King" makes such quick take-offs, fast climbs and good landings.

Even though the "Air-King" weighs but 1,095 pounds empty, it is not a small ship. Wing area is 300 square feet; useful load is 850 pounds, 26 feet long, 8-2/3 feet high and with a 33 foot span it is just the right size ship for small landing fields, commercial work, student training and pleasure use.

Its price, too, is as great a surprise as its mechanical superiority. Find out all about this fair-in-value "Air-King". Address

Write for  
catalog, specification,  
attractive price below.



**NATIONAL AIRWAYS SYSTEM, LOMAX, ILL.**

base engine. The engines are stra-angled, have dual ignition and are equipped with magneto starters which render starting up, even in the coldest weather, very easy.

Corliss Reed gas turbine propellers are fitted. They are five feet in diameter and have single clearance, since the fuses of the plane intercept them. There is an factor whatever in the system. However, the location of the propellers behind the wings, as practice generally renders the engine to persons entering or leaving the cockpit of the machine.

#### Fast and Oil System

The oil system, including the pressure gauge, is integral with each individual engine and is connected with it. The gear tanks, one above each engine, vary in size, sufficient for eight hours' engine speed flight. Fuel-proof transparent with indicate the fuel content in all tanks. Emergency supply traps are located in each tank, permitting a  $\frac{1}{2}$  hr. flight at full speed, after the gauge shows empty. There are no pumps, the fuel being entirely controlled by gravity. Drums and a line strainer are conveniently connected to the engine oil system increasing efficiency.

The controls are of steel tubing, welded, and are connected to the main struts at three points. There is no vibration at any speed, and one of the greatest features is the quick interchangeability of power plants. Each complete engine unit can be changed rapidly, as it weighs complete, but 330 lbs. It can be taken off the ground in an even mounting. It is a real problem to maintain, and can be easily repaired by the professional operator, and it is a easy matter when operating far from a base to carry a spare power plant with the plane.

During flight tests, undertaken by different pilots, excellent results have been obtained with the Twin-49. It has been flown at over engine idle ratings, carrying a useful load of 500 lbs. at over 100 m.p.h. and the engine has not failed. Trials in cold climates have been made with this load, from 30° to 40° below zero. The take-off distance has been found to be about 100 ft. and, without a passenger, the machine can be pulled off the ground with ease in 75 ft. These figures assume a normal head wind of from five to ten miles.

It is extremely interesting to note that the features of safety carried through in the design of the machines are those stipulated in the new Department of Commerce civil air regulations for Class 3 airplanes, the highest required in any class.

#### General Details

The main specifications of the plane together with the manufacturer's figures of performance are as follows:

Span	57 ft.
Length	37 ft. 10 in.
Height	10 ft. 6 in.
Incidence	5° 45'
Decidence	1° 45'
Gear	11 ft.
Wing area, with struts	400.00 sq. ft.
Stabilizer	21.00 sq. ft.
Horizontal tail	11.4 sq. ft.
Vertical tail	3.0 sq. ft.
Wings	1000 lbs.
Gear load	1000 lbs.
Driver weight	2000 lbs.
Pass.	500 lbs.
Max. speed	90 m.p.h.
High speed	85 m.p.h.
Landings speed	40 m.p.h.

#### Partial Contract Airway Lighting

One half of the flights on route C.A.M. No. 2 of the airways from Chicago to St. Louis, and route No. 3, Chicago to Dallas, were completed by Christmas. It has been announced by the Association Roads of the Department of Commerce (C.A.M. No. 2 covers a distance of 257 miles and C.A.M. No. 3, a distance of 360 miles).

The flights on C.A.M. No. 1, from Boston to New York, are expected to be in operation by Feb. 1.

#### Goodyear Completes 100th Airship

The one hundredth Goodyear airship, a triplane dirigible to be used by the United States Army Air Corps, was completed at the Goodyear Aeroplane and Motor Company, the Goodyear Tire & Rubber Company, it was announced from the office of Vice President, Shultz, of the company.

The Goodyear Company, a pioneer in the manufacture of lighter-than-aircraft, has been in the aeronautical construction business for more than 32 years and nearly all of the 100 airships designed and built there were delivered to the United States Army or Navy flying services.

One of the names and one of the mottos, in the Goodyear belief, is "Safety First," and the first hundredth airship was also named in the erection of the latest ship.

Three years ago, the Goodyear company bought the Zeppelin patent and operating right to the United States, together with a staff of rigid airship experts from Germany, augmenting the aeronautics department in the Akron factory of the tire company. Engineers of the Goodyear-Zeppelin Corporation have been engaged in the design of a rigid airship for the United States Army. The airship would be nearly three times the size of the Los Angeles and the largest ever constructed.

With the completion of the one hundredth Goodyear airship, it was pointed out that no one of either the Army or Navy air corps ever lost his life in any of these hundred ships.

#### Potential Foreign Markets

Manufacturers of aircraft and aircraft engines who are on the "Reportant's" Index of the Bureau of Foreign and Domestic Commerce are entitled to and substantially receive much valuable information concerning foreign aircraft markets, as well as any other opportunities for their products and services. Late in October a number of inquiries regarding American aircraft products has shown a marked increase, inquiries having been received from such highly competitive countries as Great Britain, Germany, Switzerland and France.

American manufacturers of aircraft and aircraft engines, who are interested in the export phase of the industry, should take note that the air as the Bureau of Foreign and Domestic Commerce has it, is divided into two and also that offices from this district offer a list of the foreign offices of the Bureau. These foreign offices should be provided with the latest literature descriptive of its products and, as far as possible, with price to U.S. factory. This would aid the Bureau's foreign representatives in their efforts to promote the sale of these products, and these readings could be referred to by the manufacturer.

Each a distribution of advertising matter by American manufacturers would be particularly timely at the present time as it will coincide with the Air Corps flight around South America and the World Survey of Airplane Markets being made by the Aircommodity Divisions of the Bureau of Foreign and Domestic Commerce.

#### A Monument to the Wrights

Senator Elwood Mead, (Rep.), Connecticut, has introduced Senate Bill 4575 to provide for the erection of a monument on Hill Devil Hill, at Kitty Hawk, N. C., to commemorate the first successful flight of a power-driven airplane at that place on Dec. 17, 1903. The bill reads as follows:

Section 1.—That there shall be erected on Hill Devil Hill, at Kitty Hawk, in the State of North Carolina, a monument to be known as the "Monument to the First Successful Flight of a Power-driven Airplane," achieved by Orville Wright on Dec. 17, 1903; and a inscription to be composed of the Secretary of War, the Secretary of the Navy, and the Secretary of Commerce is hereby directed to carry out the purposes of this act.

Section 2.—That such sum or sums as Congress may hereafter appropriate for the purpose of this act are hereby authorized to be appropriated.

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Different Color*

**FUNDAMENTALLY**  
different in design, distin-  
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pointments, and amazingly  
different in performance.

*Send your name for full details.*

**KENTUCKY  
AIRCRAFT  
CORPORATION**

*Owensboro, Ky.*



# The Bull's Eye Bailey 140 HP. Engine

*A New Seven-Cylinder Air-Cooled Radial Engine for Commercial Airplanes. The Engine is Exceptional for Its Simplicity.*

THESE DAYS long have felt a demand for an airplane engine of 180-190 hp. for commercial and other classes of aerodrome flying. A new entry in this power class is the Bull's Eye Radial engine which, while it has only very recently made its appearance, is already fulfilling its purpose and showing the reliability.

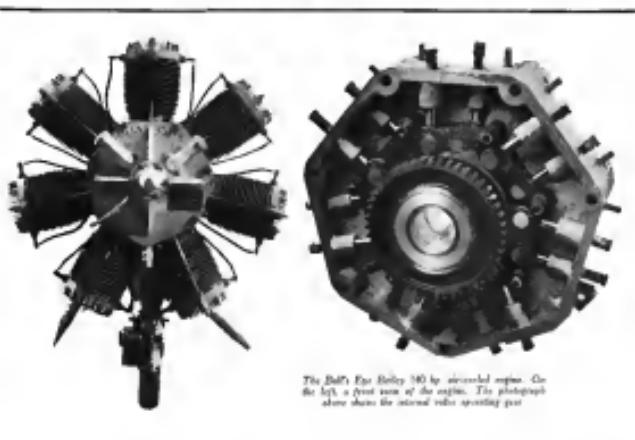
The Bull's Eye is a seven-cylinder, air-cooled radial engine, with a bore of 4.5 in. and a stroke of 3.75 in., developing 140 hp. at 2,000 r.p.m. over a weight of 365 lb. mounted and ready to run.

Of the many outstanding features of this engine, probably the most important and the one making it particularly adapted to commercial use, is its extreme simplicity. The engine measures only 31 in. in diameter, contains only 78 moving parts, consists in a three-piston cylinder of four aluminum blocks with all joints ground, eliminating outside the use of gaskets.

#### Stupified. Valve Action

A particularly interesting detail regarding the engine is the "L" head valve action, which not only eliminates the complicated overhead valve mechanism, but makes possible the flanging of the aluminum cast cylinder head, thus increasing the cooling area of the cylinder to a marked degree. The "L" head principal shape is accomplished over the valve-head type in making possible the lifting of the valve in a direct line of its travel.

The cylinders are cast of semi-diesel, heat treated, and with the exhaust and intake ports on the rear, insuring an even cooling of the valves. The casting flanges are exceptionally deep and are responsible for the cool operation and low oil



The Bull's Eye Bailey 140 hp. air-cooled engine. On the left, a front view of the engine. The photograph above shows the internal valve operating gear.



The Five Army-Loening Amphibian Planes now circling Central and South America on a flight of 18,524 miles

are equipped with

## STANDARD STEEL ADJUSTABLE PITCH ALL METAL PROPELLERS



One of the Loening amphibians of the Pan-American flight, powered with several Liberty Engines equipped with these Elated STANDARD STEEL PROPELLERS

During 1926 many new military, naval, air mail and commercial planes were added to the list of STANDARD STEEL PROPELLER Equipped Aircraft.

Standard Steel Propeller Company  
Pittsburgh, Penn.



The *Waterhouse Racer* equipped with the new *Douglas D-2* engine, which yielded increased engine, 140 hp.

these tests, the following performance was obtained with a load of pilot, one passenger and 27 gal. of gasoline:

Cruising speed in level flight at 1,000 ft. a.s.l.	75 m.p.h.
Ground speed, M. 1000 ft. a.s.l.	79 m.p.h.
Forced landing	45 m.p.h.
Altitude	10,000 ft.
Average gasoline consumption at 3/4 of max. speed	16.5 gal.
Average gasoline consumption at 3/4 of max. speed	16.5 gal.
Average consumption at 3/4 of max. speed	16.5 gal.

This performance not only is excellent for an engine of this weight and power, but equals very well of the three-place *Waterhouse Racer* biplane.

#### Air Patrol Vital Part of Forest Service

A report has recently been submitted by the Commandant General of the U.S. Forest Service, Mr. Frank C. Davis, on aerial forest fire patrols conducted by the Patrolling Service during the past summer. It states that it is interesting to note from the number of very significant records of the various patrol pilots rendering report that the veritable possibilities of the patrol planes are being discovered and used more and more by the Forest Service each year.

In the opinion of the Commandant General, patrols during the months of June and September, however, a total of 200 new fires discovered by airplane observers, in the total of 388 patrol flights made, covering 30,876 sq. m., an area of approximately 3,711,435 sq. m. as was observed. Patrol bases were established at Eugene, Ore.; Spokane, Wash.; Mather Field, Sacramento, Cal.; Griffith Park, Los Angeles, Cal.; and Red Post, Wash. An average of eight airplanes were on constant duty during the fire period season. The flying time totaled 2,000 hours and 32 min.

In addition to its actual fire fighting work "spotting" and reporting new fires, reconnoitering and mapping old ones, the patrol plane was used to photograph points of particular interest to the Forest Service, to make aerial surveys of road construction and timber stands, and, in one instance, to negotiate with and authorise the cutting of timber in a forest to locate the body of a young man who was drowned in Donner Lake, Cal., after having runned away from drowning.

As an instance of the simplicity in fire detection, the follow-

ing is quoted from a report submitted from the Seed Point Base:

"Lookout Southeast of Chukla made several reports of a fire located on a lesser known and extended distance. Men were sent north through the territory in which the fire was supposed to be, but could find nothing. The lookout was so certain that there was a fire that a plane was sent from Spokane."

"We flew over the country given and returned by wild loops as we were able to look directly down on a strip of country in the 10 to 15 miles distance from all of the known fire points. We located all possible causes for the smoke and the fact that we could find even the smallest fire was positive assurance that the large fire reported by the lookout really did not exist."

"The same work accomplished by a ground reconnaissance would have cost a great deal more and would have required much more time. It seems that work of this character, definite intuition, are simplified by the use of airplanes."

#### Committee to Award Collier Trophy

Peter Adams, President of the National Aeronautic Association, has announced the appointment of the following committee to award the Collier Trophy for the year 1926: Dr. George W. Lewis, Bert S. Fawley, F. G. Edwars, and Gen. P. Schreyer.

This trophy was donated in 1913 by the late Robert J. Collier, and the deed of gift provides that it is to be awarded annually by the National Aeronautic Association for the most meritorious achievement in aviation. In addition, the value of which has been demonstrated by action during the preceding year.

It will be remembered that in 1925 R. Bert Reid was the award for the development of a metal enclosed propeller.

The committee will meet in Washington during the month of January to make the award, and a luncheon in this connection will be submitted to the National Aeronautic Association, 3000 16th Street, N.W., Washington, D. C., together with affidavits of the supporting testimony on or before Jan. 15, 1927.

## American Aircraft Directory

Many changes have been made by Aviators for information regarding state laws, municipal ordinances, commercial ports, airports and aircraft operators throughout the United States. To meet the demand, the *American Aircraft Directory* will be published in 1927 in book form with many maps, illustrations and advertisements. As many of our readers wish this information immediately, these will be published each week, the data which has been received to date.

It is expected that many additions will be made and our readers are requested to send any corrections, additions or suggestions that they may have. Copyright, 1927, by Gardner Publishing Company.

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John Chas. a/c Alice Garage & Motel

###### BEST

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###### MONTECILLO

L. W. Thompson

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W. H. Neff

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W. F. Quisenberry

###### PEPPER

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###### PEPPER

John Pepper, Angel Flying Co.

###### TELEGRAPH

Hotel Gram

#### STATE DIRECTORY

##### BENTONVILLE

Flying Field

Commercial Field

Location: 4 mi. N. of city

Facilities: Supplies available in city

##### LITTLE ROCK

Flying Field

Commercial Airport

Location: 1/2 mi. S. of city

Description: 1,500 ft. 2,000 ft. E. and W. 2,500 ft. N. and S.

Facilities: Hangars and all accommodations

Municipal and Government Flying Field

Location: 1/2 mi. S. of city and just SW of

Airport, Riverfront

Description: Approximately 2,000 ft.

Facilities: Hangars and other repairs available

AIRPORT ORGANIZATIONS:

Local Flying Club, N.A.A.

Monroe Wright, 101 Union Trust Co.

Price, Whitehead, Price

MONTICELLO

Flying Field

McGillis Field

Location: 250 mi. S. of Portland

Description: 1,000 ft. E. and W. 1,000

ft. N. and S. Hangars available

PHILADELPHIA

Municipal Flying Field, owned by E. G. Gandy

Location: 1/2 mi. from portofiles

Description: 3,000 ft. E. and W. 600 ft.

Facilities: Supplies available in city

PHOENIX

City Flying Club, Chapter No. 4

Location: 213 W. 2nd St., Phoenix

Description: 1,000 ft. W. 2nd St., Phoenix

Facilities: Supplies and motor repair

PIPER

Commercial Flying Field

Location: 1/2 mi. S. of city

Description: 1,500 ft. 2,000 ft. E. and W.

Facilities: Hangars and all accommodations

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Location: 1/2 mi. S. of city

Description: 1,500 ft. 2,000 ft. E. and W.

Facilities: Hangars and all accommodations

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Location: 1/2 mi. S. of city

Description: 1,500 ft. 2,000 ft. E. and W.

Facilities: Hangars and all accommodations

#### LONG BEACH

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Urban Branch, 450 E. Seaside St.

O. W. Tamm, 9625 Elmore St.

LOS ANGELES

Los Angeles Air Commerce Corp., 2016

W. H. McNeely, 2400 West 20th St.

Charles B. Stevens, 3200 West 20th St.

To be continued















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Manufacturers of the *Craftsman* Airplane  
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## SEAMLESS STEEL TUBING

Made to Aircraft Specification 10225-D  
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Quantity of 220 H. P. Hispano's,  
new and complete. Write for  
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## AIRCRAFT SERVICE DIRECTORY

CONTINUED



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MARTELLI WALNUT PROPELLER CO.

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